Small Business Innovation Research/Small Business Tech Transfer

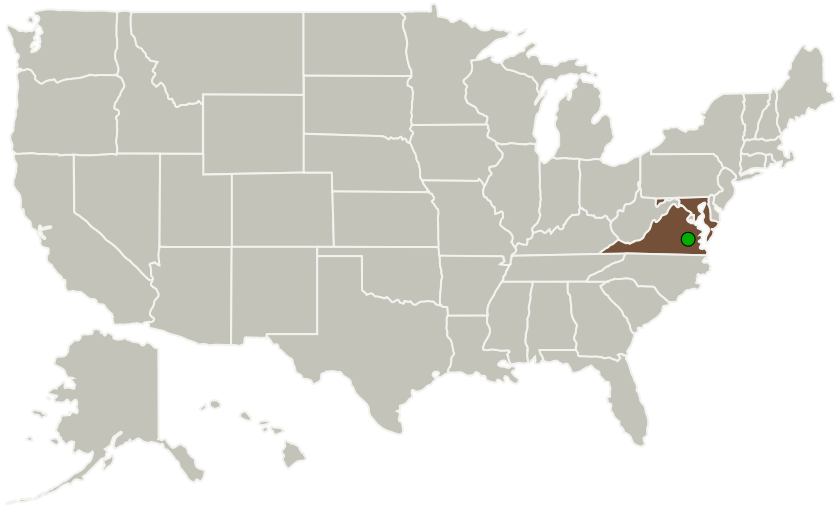
Reduced Order Modeling for Aeroservoelastic Control and Analysis (RACA), Phase I

Completed Technology Project (2016 - 2016)

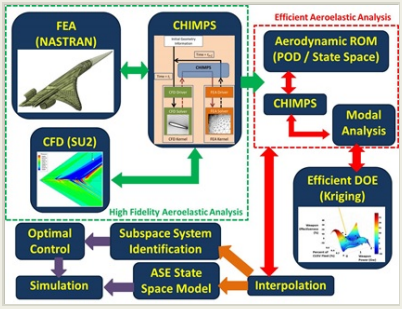
Project Introduction

NASA and other government agencies have been plagued by aeroelasticity of aircraft structures for a long time. The traditional approach has been to build stiff structures for suppressing aeroelastic effects. However, the increase in computational technology has enabled a careful analysis of aeroelastic effects, and design of lightweight structures. However, a direct CFD-CSD coupling is still too expensive to be used for control simulations and design. To address this critical need, IAI is developing reduced order models to capture the necessary physics, while enabling much more efficient computation. Our RACA approach will systematically study ROM technology and develop the appropriate methods for our particular application of interest — supersonic low-boom aircraft. We will develop a full-fledged aeroelastic analysis framework as well, to provide simulation-based verification results. The ROMs developed will then be used for control system design and demonstration of adaptive control technologies for advanced flexible aircraft.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia



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Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

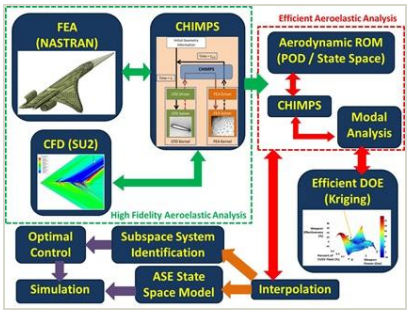
June 2016: Project Start

December 2016: Closed out

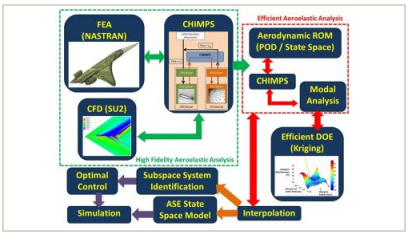
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140107)*

Images



Briefing Chart Image
Reduced Order Modeling for Aeroservoelastic Control and Analysis (RACA), Phase I *(https://techport.nasa.gov/image/131643)*



Final Summary Chart Image
Reduced Order Modeling for Aeroservoelastic Control and Analysis (RACA), Phase I Project Image *(https://techport.nasa.gov/image/129810)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

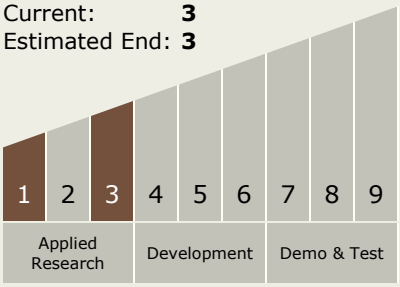
Carlos Torrez

Principal Investigator:

Peter Chen

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System